

Travel Analysis Process for the Elk Creek Watershed Project

Executive Summary

The Elk Creek Watershed Project is being proposed by the Happy Camp/Oak Knoll Ranger District. The project goals are to manage forest stands to be more resilient to future disturbance while improving habitat for Northern Spotted Owl, Roosevelt Elk, and Anadromous fish species. Another management goal for the project is to improve watershed health for Elk Creek, which is both a key watershed and municipal water supply to the town of Happy Camp. All of this should be done while taking into consideration the benefits being gained and lost by the public.

Step 1: Setting Up the Analysis

Purpose:

- Establish an interdisciplinary team and clarify roles.
- Develop a list of data needs and a schedule for completing the analysis.
- Identify the scope and scale of analysis. Scope refers to the range of potential actions to be considered. Scale refers to the level at which analysis is conducted.
- Establish and complete an accurate inventory of the transportation system in the area to be analyzed.
- Identify the appropriate depth for travel analysis based on the skills and resources available and the complexity and scope of the issues prompting the analysis.
- Consider opportunities to integrate travel analysis with watershed analysis or landscape assessments.

Project Area and Objectives

The objectives of this Travel Analysis Process (TAP) are to provide science-based information for managing a transportation system that adheres to the Klamath National Forest Land and Resource Management Plan (LRMP), safe and beneficial to the public, minimize negative impacts to the environment, and to feasibly manage the Forest Service road system in relation to economic and physical limitations.

This TAP will be conducted for the Elk Creek Watershed Project Area. The project is located within the Elk Creek and Ukonom Creek-Klamath River 5th-field watersheds. The project is about two miles south of Happy Camp California, Siskiyou County: Township 16 North, Range 7 East, Sections 14, 15, 22 to 27 and 34 to 36; Township 16 North, Range 8 East, Sections 19 to 22 and 27 to 34; Township 15 North, Range 7 East, Sections 1 to 3, 9 to 15, 23 to 27, and 34 to 36; Township 15 North, Range 8 East, Sections 15, 19, 20 to 22, and 27 to 34; Township 14 North, Range 7 East, Sections 1 to 3, Humboldt Meridian and Township 45 North, Range 12 West, Sections 17 to 20 and 29 to 31; Township 44 North, Range 12 West, Sections 5 to 8, 17 to 19, Mount Diablo Meridian. Elevation ranges from 1,600 to 3,600 feet.

Specialists

The risk and value analysis was conducted by Gregg Bousfield, the Supervisory Forester on the Happy Camp Ranger District. Recommendations were developed through a panel of interdisciplinary team (IDT) members by considering the risks and values associated with each road within the project area. A summary of recommendations can be seen in table 3. The IDT members and their corresponding resource are listed below:

Table 1: List of interdisciplinary team members and their resource

| Team Member | Resource |
|---|-------------------|
| Alex Vindas Cruz, Archaeologist | Heritage |
| Matt Watson, Fuels Officer | Fire/Fuels |
| Sean Hill, Wildlife Biologist | Wildlife |
| Gregg Bousfield, Forester (former Hydrologist) | Water Quality |
| Angie Bell, Geologist | Geology |
| Todd Drake, Forester | Forest Vegetation |
| Karl Dietzler, Landscape Architect | Recreation |
| Earl Crosby, Karuk Tribe Watershed Restoration Coordinator | Karuk |
| James Main, Lands and Minerals Administrator | Misc. Public Uses |
| Erin Lonergan, Botanist | Botany |
| Jon Grunbaum, Fisheries Biologist | Fisheries |

Information Needs & Considerations

This information is required to proceed with analysis.

- Accurate location of system roads within the project area.
- For roads within the project area the following information was needed:
 - Known/existing public, permittee, or agency use
 - Any right-of-way dedication to the forest service
 - Any additional right-of-way required
 - Maintenance responsibility for the road
- Watershed resources, invasive species, biological communities and other potential environmental risks associated with roads.
- Current observed uses and potential conflicts, user safety, and accessibility.
- Current travel management objectives.
- Best management practices for the area.
- Forest plan, as well as other management directives for the area.
- State laws that regulate motor vehicle use on and off public roads.
- Applicable federal, state, and local laws.
- Public/user groups values and concerns
- Cultural resources.
- Economic costs and benefits.
- Interrelationships between state, county, tribal, and other federal agencies.

- Availability of resources for maintenance and administration of roads. (Grants, agreements, and volunteers may be used to extend FS resources)
- Existing or potential law enforcement issues.

Step 2: Describing the Situation

Purpose

The purpose of this step is to:

- Summarize current transportation system within the project area.
- Summarize the current land management direction

Existing Transportation System

There are 142 miles of road within the project area boundary.

Existing Direction for the Transportation System

Forest Plan

The Klamath National Forest Land and Resource Management Plan has been in effect since 1995 and is a set of goals, standards, and guidelines used to guide management of the Klamath National Forest. Two types of standards and guidelines apply to management of the Forest. Forest wide standards and guidelines apply to all management areas compared to management area specific standards and guidelines. The guidelines within the LRMP pertaining to the Elk Creek Watershed Project consist of the following:

Forest wide Standards and Guidelines

4-1 Use the Watershed Improvement Needs (WIN) inventory and the Forest assessment process to develop and maintain a priority list of watershed restoration projects. Give priority to projects identified in the WIN inventory that will restore, protect, or enhance domestic use waters, streams supporting populations of Threatened and Endangered fish species, and watersheds not meeting water quality objectives. Restoration efforts should be placed on management-induced adverse impacts. "Naturally occurring" sedimentation and other adverse impacts to meeting watershed and fisheries objectives may be mitigated as opportunities arise. "Naturally occurring" sedimentation levels may not be able to be mitigated. Restoration efforts should be feasible and designed to efficiently meet management objectives.

5-3 A dust abatement strategy should be considered for all projects. Each strategy should address the reasonable opportunities to reduce the level of short-term and long-term dust generated from existing roads and those constructed in the future.

* 6-23 No new roads will be built in remaining unroaded portions of inventoried (RARE II) roadless areas in Key Watersheds.

* 6-24 Reduce existing system and nonsystem road mileage through decommissioning of roads. Road closures with gates or barriers do not qualify as decommissioning or a reduction in road mileage. If funding is insufficient to implement reductions, there will be no net increase in the amount of roads in

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Key Watersheds. That is, for each mile of new road constructed, at least one mile of road should be decommissioned, and priority given to roads that pose the greatest risks to riparian and aquatic ecosystems.

6-29 Conduct an ID review of both "system" and "non-system" forest roads to determine a desired road network within key watersheds. Prioritize roads for relocation and restoration or closure, based on the impact to Forest resources, the value of the riparian resources affected, and the need for each road.

6-30 Establish acceptable road densities based on watershed size, landscape stability, and the ability of distinct topographic areas to deliver sediment to the stream.

6-31 Evaluate the ability of existing crossings to handle 100-year flood flows. Where crossings do not meet the 100-year flood flow capacity, develop a program to upgrade those crossings or show through analysis that a lesser structure with higher risk of failure would result in less habitat damage than the larger structure with less risk of failure.

6-32 In fish-bearing streams, design new road crossings to maintain a natural stream bottom. Existing low water crossings should be evaluated for impacts on aquatic resources and reconfigured as appropriate.

* 6-46 Watershed restoration will be an integral part of a program to aid recovery of fish habitat, riparian habitat, and water quality. Restoration will be based on watershed analysis and planning. Watershed analysis is essential to identify areas of greatest benefit-to-cost relationships for restoration opportunities and greatest likelihood of success. Watershed analysis can also be used as a medium to develop cooperative projects involving various landowners.

* 6-47 Watershed restoration should focus on removing and upgrading roads.

8-44 Manage "open" road densities to reduce the level of human interaction with bears during critical times of the year.

8-52 Develop a comprehensive management strategy in consultation with the CDFG. Project planning proposals should include consideration of habitat enhancement, enhancement and protection of key use areas and open road management. Manage for a high habitat rating.

8-54 When appropriate, close roads to limit activities that inhibit elk use of quality foraging, fawning/rearing, or wintering areas.

11-1 Visual Quality Objectives (VQOs) were developed using Agriculture Handbooks 462 and 559, which define nationally established principles and methods of the Visual Resource Management System. The VQOs apply to site-specific projects visible from the Forest's inventoried Moderate and High Sensitivity Viewpoints (Level 1 & 2). The VQOs are minimum conditions to be achieved as soon as possible in all management areas and within 3 years for all VQOs except Preservation and Maximum Modification, which must be met immediately. Facilities and developments, such as roads, trails, campground facilities, structures, signs and interpretive stations, are not required to meet the Management Area VQOs when viewed in immediate foreground (300 feet). These developments will be crafted in materials and appearance to harmonize and compliment the natural character of their immediate settings.

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Maintain an inventory of High and Moderate Sensitivity Viewpoints on file in the Forest Supervisor's Office.

12-1 Manage Forest resources to provide a broad range of recreational opportunities that meet changing recreational demands. Actively utilize the Forest's Meaningful Measures methodology for establishing recreation program standards, monitoring, and reporting accomplishments. Identify, develop, and conserve recreational opportunities within developed and dispersed settings. Eliminate or restrictively manage sites that receive minimal use; or, remove the facilities and manage them as dispersed spots. Develop a range of recreation opportunities within primitive, semi-primitive non-motorized, semi-primitive motorized, and roaded natural areas. As opportunities are identified for these areas, they should be managed to reflect the needs of a multi-cultural public. Provide a variety of sites to meet visitor preferences, needs and expectations to complement opportunities within the recreation emphasis area in which the site is located.

12-14 The Forest should manage the use of the existing trail system to serve the needs of recreationists in a condition that protects the resource and meets health and safety standards. Trails should be managed to accommodate all kinds of use, such as mountain biking and hiking. These recreational uses may not always be compatible and may require separation or restrictions based on management objectives.

12-17 Locate new trail segments so as to "lay gently" on the land. Take advantage of natural features that screen trails from distant viewpoints.

20-1 Transportation planning shall be an integral part of Ecosystem Analysis at the landscape/watershed level and of environmental analysis at the site level. Planning efforts should include a review of the existing Road Management Objectives (RMOs) and proposals for the development of new roads. Develop RMOs through an ID team. Place needed non-system roads in the Forest road system. Non-system roads shall be "put to bed." Direction for transportation planning is found in FSM 7710, Transportation Planning Handbook, Forest Service Handbook (FSH) 7709.55. The analysis should:

- 1) Identify and evaluate alternative transportation systems and routes,
- 2) Identify short- and long-term need and purpose for each road, and
- 3) Document decisions relating to road location, design, operation, and maintenance standards for each road in a RMO.
- 4) Evaluate the risk of spread of Port-Orford-cedar root disease through road upgrades, seasonal closures, permanent closures, maintenance, and decommissioning or obliteration.

20-3 Operate and maintain roads as documented in the RMO. Coordinate road management objectives with private landowners within the Forest. Roads maintained for passenger car use should be maintained at Maintenance Levels 3, 4 or 5. Roads managed for administrative use should be maintained at Level 2. Maintenance activities taking place on a regular basis on Level 2 roads will be those that maintain drainage, minimize resource damage, and allow high clearance vehicle passage. Roads that have planned future use, but not for several years, will be maintained at Level 1.

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Maintenance work on these roads should include an annual inspection to assure that resource damage is not occurring.

20-4 Road closures may be used to meet wildlife needs, water quality and soils protection objectives, fire protection, other resource needs, to reduce road damage and maintenance costs, and to reduce or eliminate conflicts between user groups.

20-5 All commercial use, as described in FSM 7730.5, shall require road use permits.

Management Area Standards and Guidelines

Management Area 3 (Designated and Recommended Wild Rivers)

MA3-10 Maintain existing trails to promote foot access through the area. Design new trails to promote a dispersed recreation experience.

MA3-18 No roads or other provisions for overland motorized travel shall be permitted within the management area. Allow unobtrusive trail ridges.

Management Area 10 Riparian Reserves

*MA10-41 Federal, state, and county agencies should cooperate to achieve consistency in road design, operation, and maintenance necessary to attain Aquatic Conservation Strategy objectives.

*MA10-42 For each existing or planned road, meet Aquatic Conservation Strategy objectives by:

- a) Minimizing road and landing locations in RRs.
- b) Completing watershed analyses (including appropriate geotechnical analyses) prior to construction of new roads or landings in RRs.
- c) Preparing road design criteria, elements, and standards that govern construction and reconstruction.
- d) Preparing operation and maintenance criteria that govern road operation, maintenance and management.
- e) Minimizing disruption of natural hydrologic flow paths, including diversion of streamflow and interception of surface and subsurface flow.
- f) Restricting sidecasting as necessary to prevent the introduction of sediment to streams.
- g) Avoiding wetlands entirely when constructing new roads.

*MA10-43 Determine the influence of each road on the Aquatic Conservation Strategy objectives through watershed analysis. Meet Aquatic Conservation Strategy objectives by:

- a) Reconstructing roads and associated drainage features that pose a substantial risk.
- b) Prioritizing reconstruction based on current and potential impact to riparian resources and the ecological value of the riparian resources affected.
- c) Closing and stabilizing, or obliterating and stabilizing roads based on the ongoing and potential effects to Aquatic Conservation Strategy objectives and considering short-term and long-term transportation needs.

*MA10-45 Minimize sediment delivery to streams from roads. Road design measures may include minimum impact location, appropriate road surfacing, armoring of ditchlines, controlled compaction of fills, outsloping of roads, mechanical and vegetative slope protection, wet weather traffic control, annual maintenance and inspection. Outsloping of the roadway surface is preferred, except in cases where outsloping would increase sediment delivery to streams or where outsloping is infeasible or unsafe. Route road drainage away from potentially unstable channels, fills, and hillslopes.

MA10-50 Closed and restored roads should be configured for long-term drainage and stability.

Management Area 17 (General Forest)

MA17-5 Develop a transportation network that effectively and efficiently allows the transport of commodities to available markets. The system should be economical, safe and environmentally sensitive.

MA17-6 Maintain surplus or infrequently used roads in a self-maintaining condition (Level 1) to reduce watershed and wildlife impacts and to reduce road maintenance costs.

Step 3: Identifying Issues

Purpose

- Identify the problems with the transportation system within the project area

Key Issues

1. Insufficient resources to maintain existing road system

Inadequate maintenance may reduce access for users and managers. Future funding could be less than needed to cover road maintenance and monitoring costs.

2. Increased risk of human caused fire

"As many as 90 percent of wildland fires in the United States are caused by humans. Some human-caused fires result from campfires left unattended, the burning of debris, negligently discarded cigarettes and intentional acts of arson." (National Park Service, 2016). Areas used heavily by the public run a higher risk of human-caused fire starts.

3. Need to access areas for fire containment

The transportation system is used by land managers and wildland firefighters to access areas for emergency measures, fuels treatment, back burning, and thinning.

4. Need for access to firewood and other forest-product gathering areas

Firewood, traditional materials, and plant gathering are all important activities.

5. Known cultural resources and tribal use

Public access to known cultural resources can result in damage. Decreasing road densities could inhibit tribal access to culturally relevant locations.

6. Roads have effect on wildlife habitat

Reduced road maintenance, new construction, improper re-routing by users, and non-compliance with closures can cause a reduction in wildlife habitat productivity.

7. Roads have effect on watershed condition and aquatic habitat

Erosion within the transportation system is known to cause increased sediment loads into streams. This can decrease watershed health and decrease habitat suitability for aquatic species. "Unpaved roads often are a major source of sediment to streams in forested watersheds, and an increase in sediment production and delivery can adversely affect the overall health of a stream." (Stafford, 2011). Increased sediment inputs into streams can decrease productivity of spawning beds for anadromous fish populations. The California State Water Board has linked sediment increases to temperature increases. Increased temperature has impaired the Klamath Basin as a whole.

8. Roads provide access to the public for recreation

Forest roads are used for hunting, fishing, driving for pleasure, camping and biking. Forest roads are also used recreationally to access trailheads and swimming holes.

9. Access for forest vegetation management

Roads within the project area are used to access timber sale unit as well as plantations.

10. Roads and the spread of invasive species

Roads can cause the introduction and spread of invasive plant species as well as disease.

Step 4: Assessing Benefits, Problems, and Risks

Purpose

- Examine the major uses of the transportation system within the project boundary
- Examine the environmental, social and economic effects of the transportation system within the project boundary.
- Analyze the risks and Benefits associated with each road

Major Uses

The roads within the Elk Creek Watershed Project allow access for:

- Firefighting equipment and personnel
- Forest Service employees and contractors for timber management, restoration, surveys and monitoring, fuel reduction and weed pulling
- Recreational uses; hunting, fishing, driving for pleasure, camping, firewood harvesting, collecting of culturally important plants, and access to hiking trails.
- Access to private property

Environmental, Social and Economic Effects

The environmental effects of the transportation system include increased anthropogenic sediment delivery to streams which reduce the quality of habitat for aquatic species. An article written by Chokhachy et al. and funded by the USFS states, "Promoting revegetation of roads through closure can dramatically reduce sediment production while still allowing some maintenance of infrastructure for future management and avoiding the high costs of complete road obliteration. Ultimately, we suggest

that cost-benefit analyses that explicitly consider ecological effects and financial obligations associated with different management approaches are warranted.” This statement links both economic and environmental effects. When considering environmental effects it is important to note that Elk Creek is designated as a Key Watershed. Key watersheds are given highest priority for watershed improvement.

Reducing the number of roads can have a multitude of economic effects for not only land managers, but also the public. Less roads can equate to lowered transportation management costs from regular upkeep. There is a potential for an increased cost in vegetation management as roads are taken out of the transportation system. Overall costs for wildland fire management should be decreased, since the likelihood of human caused fire decreases with less access. “Managers concerned about fires can close and decommission roads that contribute to human-caused fire ignitions and treat fire-prone tree plantations where fires have been shown to burn uncharacteristically severe.” (Odion et al. 2004, Bradley et al. 2016). Economic effects for the public could include reduced access for firewood cutting, hunting, and gathering of forest products. The public may also benefit economically from a reduction in roads if the roads that remained were improved, essentially allowing more access with a reduced overall road density.

Social effects include an overall loss or gain in access for the public, depending on the allocation of funding and the maintenance level changes within the project. The Elk Creek Watershed project area is a municipal water supply for the town of Happy Camp. Reducing road densities could benefit water quality for the town of Happy Camp. The Karuk Tribe may also benefit from less roads, because access to culturally important areas could be reduced. The less access available to culturally significant sites, the less likely vandalism or anthropogenic wildfire would occur. Although the Karuk Tribe may be benefitted by road reduction, it could also reduce their access to culturally significant sites.

Public Open House

An open house was held for the public on May 6, 2015 at the Happy Camp/Oak Knoll ranger district office, in Happy Camp, CA. A newsletter was sent out to notify locals of the event. Two persons attended the event and one person replied via email in regards to the Elk Creek Travel system. The gentlemen who contacted the Forest via email voiced concerns that a loss of drivable roads would hinder future fire suppression efforts, and potentially be a danger to the town of Happy Camp. The man was also discontent that the current management includes seasonal closures.

Risks & Benefits

Risk and benefit analysis was developed by the IDT as seen in table 1. Each specialty came up with criteria for ranking each road high medium or low benefit and risk which can be seen in table 2. The rankings can be seen in Appendix A.

Table 2: Resource issues and analysis indicators used by the IDT as evaluation criteria

| Forest Vegetation | |
|--|---|
| Benefit: Timber Management Goals (commercial) | |
| How does the current transportation system provide access to future timber management goals (commercial thinning)? | HIGH – Conifer vegetation type, Reg Class 2 (MA's 13, 15, 17) management areas, and ¼ mile from system road. |
| | MEDIUM – Conifer/Hardwood vegetation type, Reg Class 2 and 3 (MA's 6, 11, 12, 16) management areas, or ½ mile from the HIGH criteria. |
| | LOW – Hardwood/Brush vegetation type, Reg Class 2 other land allocations (MA 1, 2, 3, 5, 7, 8, 9, 10, 14) plus inventoried roadless areas or 1/2 to 1 mile from the HIGH criteria. |
| Benefit: Silviculture Management Goals (noncommercial) | |
| How does the current transportation system provide access to future silviculture management goals (noncommercial thinning)? | HIGH – Conifer vegetation type, Reg Class 2 (MA's 13, 15, 17) management areas, and stands <5 or ≥40 years old. |
| | MEDIUM – Conifer Hardwood vegetation type, Reg Class 3 (MA's 5, 6, 11, 12, 14, 16) management areas, or 5-20 years old. |
| | LOW – Hardwood/Brush vegetation type, other land allocations (MA 1, 2, 3, 5, 7, 8, 9, 10, 14) plus inventoried roadless areas, or 20-40 years old stands. |
| Benefit: Forest Products | |
| How does the current transportation system provide access to the public for forest products? aka. firewood, mushrooms, Christmas trees, etc. | HIGH – Gates open all year round, permitted activity on the firewood map, and Reg Class 2 (MA's 13, 15, 17) management areas. |
| | MEDIUM – Gates open seasonally, restricted activity on the firewood map, and Reg Class 3 (MA's 5, 6, 11, 12, 14, 16) management areas. |
| | LOW – Gates are closed all year round, activity is not allowed on the firewood map, and other land allocations (MA 1, 2, 3, 7, 8, 9, 10) plus inventoried roadless areas. |

| Karuk Resources | |
|---|---|
| Benefit: Tribal Access | |
| Access to and for Traditional Cultural Management, Ceremonial, Subsistent Hunting, and Gathering are important to the Karuk Tribe. | HIGH - High benefit road accesses to and for practicing Traditional Cultural Management, Ceremonial, Subsistent Hunting and Gathering areas and routes highlighted by tribe because it is valued and needed by Karuk Tribal Members for access. These areas may or may not be uniquely identified on maps. |
| | MEDIUM - Medium benefit road use which is a known access and/or parking area for accessing Traditional Cultural Management, Ceremonial, Subsistent Hunting, and Gathering areas. These areas may or may not be uniquely identified on maps. |
| | LOW - Low benefit road use which is a known access and/or parking area for accessing Traditional Cultural Management, Ceremonial, Subsistent Hunting, and Gathering areas. These areas may or may not be uniquely identified on maps. |
| Risk: Known Cultural Resources | |
| Karuk Cultural resources can be impacted by the transportation system. Use and maintenance of roads can impact Karuk cultural resources including our fishery. Access to areas with cultural resources increases the chance that these resources could be disturbed by the public. | HIGH – High risk road and associated use are directly impacting Karuk Cultural Resources. |
| | MEDIUM – Medium risk road and associated use are directly or indirectly impacting Karuk Cultural Resources |
| | LOW – Low risk road and associated use are not impacting Karuk Cultural Resources |
| Risk: Traditional Cultural Ceremonial Practices | |
| Public access through the analysis area depending on location and timing can result in negatively impacting the purpose and need of the ceremonial practices. Near equates to causing interference with ceremonial practices. This is a subjective term, not a set distance. It means that motorized use on a given route is having an impact upon the purpose and need of the ceremonial practices. | HIGH - High risk road is on or <i>near</i> which conflicts with ceremonial practices. Specific location of ceremonial practices will not be identified on maps. |
| | MEDIUM - Medium risk road or motorized use trail is in the general vicinity of an area where ceremonial practices are conducted. Specific location of ceremonial practices will not be identified on maps |
| | LOW - Low risk road is in area with no associated ceremonial practices. |

| Heritage Resources | |
|--|---|
| Benefit: Karuk Tribal Use/Traditional Cultural Property | |
| <ul style="list-style-type: none"> Access to Traditional Cultural Properties remains important to the Karuk Tribe. | HIGH – High benefit road or motorized use trail to access Traditional Cultural Property. Route highlighted by tribe, considered valuable or essential to access TCP or traditional use area. |
| | MODERATE – Medium benefit road or motorized use trail, may be used as an access point or parking area for accessing TCP or traditional use is known to occur. Location of TCP may or may not have been identified. |
| | LOW – Low benefit road or motorized use trail that accesses an area with no identified Traditional Cultural Properties or traditional use, or access for traditional cultural activities has not been identified as important to tribe. |
| Risk: Known Cultural Resources | |
| <ul style="list-style-type: none"> Cultural resources may be impacted by use of the transportation system. Use and maintenance of roads which cross sites will likely impact cultural resources. Accessibility to roads increases the potential for disturbed cultural resources by the public. | HIGH – High risk road has been surveyed for cultural resources, and identified sites are impacted by road, or road has not been surveyed but is located in an area with high or moderate site density. |
| | MODERATE – Medium risk road has not been surveyed but is located in a low site density area and is in an area with little to no previous survey. |
| | LOW – Low risk road has been surveyed for cultural resources and no sites are impacted by the road. |
| Risk: Traditional Cultural Property | |
| <ul style="list-style-type: none"> Public access to Traditional Cultural Properties may result in damage to properties. Access through public lands to tribal ownership properties may contribute to trespassing issues. Vicinity may allow for intrusions with Traditional Cultural Properties. This may include use of motorized vehicles/equipment on a given route interfering with traditional practitioners or ceremonial function of the TCP. Intrusions do not necessarily only mean by geographic distance, this may be viewed subjectively. | HIGH – High risk or motorized use trail is on or near an identified Traditional Cultural Property, and was identified as a concern by tribe(s) during consultation because of its proximity to TCP. |
| | MODERATE – Medium risk road or motorized use trail is in the general vicinity of an area known as a Traditional Cultural Property and/or for traditional cultural use. Specific location of Traditional Cultural Property may or may not have been identified. |
| | LOW – Low risk road or motorized use trail is in area with no identifiable Traditional Properties, and for which no traditional cultural use has been identified. |

| Geology | |
|---|---|
| Risk: Landslides | |
| Roads can contribute to an increase in landslide risk which can negatively impact sediment regimes in streams. Road damage by landslides also poses a risk to the health and safety of Forest visitors and personnel. * | HIGH – 1) More than 10% of road length has active landslides mapped or more than 20% of crossings have experienced debris flows. Or 2) Top 1/3 of CWE landslide volume normalized for road length. |
| | MEDIUM – Middle 1/3 of CWE landslide volume normalized by road length. |
| | LOW – Lower 1/3 of CWE landslide volume normalized by road length. |
| Risk: Naturally Occurring Asbestos Exposure | |
| Exposure to airborne naturally occurring asbestos from dust created by motorized travel on unpaved roads and trails in ultramafic bedrock can pose a human health and safety risk.** | HIGH – Roads with more than 0.5 miles of roadbed directly on ultramafic rock. |
| | MEDIUM – Roads with more than 0.5 miles of roadbed on a combination of directly on ultramafic rock and ultramafic rock overlain with dormant landslide deposit. |
| | LOW - Roads with less than 0.5 miles roadbed on ultramafic rock or ultramafic rock overlain with dormant landslide. |
| Risk: Unique Geologic Features | |
| Roads can negatively affect unique geologic features, many of which are non-recoverable once lost. The damage can occur due to vandalism due to increased ease of access to the features or by posing and indirect physical threats through poor road drainage, placement or sediment delivery. | HIGH – Road is within 500 feet of a known or discovered unique geologic features. |
| | MEDIUM – Road is less than or equal to 0.25 miles away from a known or discovered unique geologic feature. |
| | LOW – Road is greater than 0.25 miles away from a known or discovered unique geologic feature. |

*The [Klamath River] TMDL also identifies three targets related to the impacts of excess sediment:

1. 0 miles of substantial human-caused sediment-related channel alteration.
2. Less than 1% of all stream crossings divert or fail as a result of a 100-year or smaller flood.
3. Decreasing number of potential road-related landslide source areas.

**KNF Forest Plan Standard and Guideline 1-6: *Where existing roads and trails travel through asbestos-bearing formations or where roads are surfaced with asbestos-bearing aggregate, potential mitigation measures, such as road or trail relocation, closure, paving and watering, shall be considered to maintain public safety.*

| Water Quality and Aquatic Habitats | |
|--|---|
| Risk: Stream sediment and temperature | |
| <ul style="list-style-type: none"> Roads can degrade water quality and aquatic habitats due to excessive chronic and/or episodic sediment delivery to streams. In addition to excess sediment, roads can also impact stream temperatures due to stream shade removal from right-of-way maintenance and fill-failure induced debris flows. | HIGH – Roads with a high frequency of potential sediment source sites (culverts undersized for the 100-year or smaller flood or culverts with potential for stream diversions) OR have long segments adjacent to stream channels making road-stream connectivity difficult to mitigate as well as persistent stream shade impacts. |
| | MODERATE – Roads with few sediment source sites (culverts undersized for the 100-year or smaller flood or culverts with potential for stream diversions) OR have short segments adjacent to stream channels making road-stream connectivity less difficult to mitigate. These roads also have less stream shade impacts. |
| | LOW – Roads that do not have sediment sources and are far away from streams. |

| Fisheries | |
|---|--|
| Risk: Roads can restrict passage of fish and other aquatic organisms at road-stream crossings | |
| <p>Restoring connection to historical or suitable salmonid habitat upstream of road-stream crossings is a priority on the Klamath National Forest because expanding habitat for salmonids directly aids in maintaining viable populations and recovering ESA listed species as required by the NFMA and ESA. The Forest has inventoried nearly all stream crossings on Forest Service roads in 2001 and 2003 to identify certain or potential fish passage barriers. Additionally, it is Forest Service direction to restore passage at road-stream crossings for aquatic organisms other than salmonids.</p> | HIGH – Roads that have stream crossing(s) that partially or completely restricts access to any amount of historical and/or suitable habitat for salmon and steelhead trout, OR that partially or completely restricts access to over 0.5 mile of historical or suitable habitat for resident rainbow trout. |
| | MEDIUM – Roads that have stream crossing(s) that partially or completely restricts access to 0.5 mile or less of historical or suitable habitat for resident rainbow trout. |
| | LOW – Roads that have stream crossing(s) that provide fish passage but that partially or completely restricts access for non-salmonid aquatic organisms. |

| Threatened, Endangered, Sensitive Plant Species | |
|---|---|
| Risk: Effects to TES species from proximity of roads | |
| Special status species can be affected by roads due to fragmentation of habitat, changes in hydrologic regimes resulting in increased or decreased moisture from roads, dust deposition, maintenance of roadside vegetation with masticators, vandalism to populations in direct view from travel routes, and predation from grazers using roads as travel corridors. | HIGH – roads within 100’ of TES populations. |
| | MEDIUM - roads within 100-500’ of TES populations. |
| | LOW – roads more than 500’ from TES populations. |

| Non-native Invasive Plant Species | |
|---|---|
| Risk: Potential for Introduction and/or Spread of Invasive Species | |
| Roads are one of the main vectors of introduction and spread of invasive plant species. Vehicles and equipment can carry seeds and plant parts along travel corridors. Roads that access recreational areas and receive high use are at the highest risk. Travel from infested areas to un-infested areas is also a mechanism of spread. Road maintenance activities on highly infested roads can also spread invasive species. | HIGH – roads that receive high use and frequent maintenance, and that access recreational destinations: campgrounds, trailheads, special interest areas, dispersed camping areas; roads used to move or gather cattle or horses. |
| | MEDIUM – roads that receive moderate use and infrequent maintenance: roads closed seasonally, roads that access special use developments such as electronic sites, water lines, telephone corridors etc. |
| | LOW – roads infrequently used and are not maintained, such as a Level one road. |

| Wildlife | |
|---|--|
| Risk: Meadow/Grassland Habitat Degradation | |
| Roads have an effect on meadow and grassland associated wildlife species through motorized vehicle disturbance, habitat loss or degradation in meadows, riparian shrub, and grasslands. | HIGH – Roads are located within meadows, riparian shrub or grasslands |
| | MEDIUM – Roads are open roads that access or are adjacent to (within 200') meadows, riparian areas or grasslands. |
| | LOW – Roads do not meet the criteria for High or Medium |
| Risk: Mature or Old Growth Forest Habitat Fragmentation | |
| Roads have an effect on mature and old-growth forest related wildlife through habitat loss or degradation; roads fragment habitat by creating edge and smaller patches. | HIGH – Roads are in late-successional or old growth forest which have a road density of greater than 3 mi/mi ² |
| | MEDIUM – Roads are in late-successional or old growth forest which have a road density of between 1.5-3 mi/mi ² |
| | LOW – Roads are in late-successional or old growth forest which have a road density of less than 1.5 mi/mi ² |
| Risk: Mature or Old Growth Forest Habitat Nest/Den Areas | |
| Roads can fragment or cause disturbance to raptor nest stands and denning stands lower on slopes and near streams were nesting/denning is more likely to occur. NSO Recovery Action 10: maintain NSO ACs. (NRF surrogate) | HIGH – Roads are on the lower 1/3 of slope and along streams in suitable NSO habitat (NRF) OR Roads that intersect NSO ½ mile core areas. |
| | MEDIUM – Roads are mid-slope roads (middle 1/3) in suitable NSO habitat (NRF). |
| | LOW – Roads are located on upper 1/3 slopes and ridgetops in suitable NSO habitat (NRF). |
| Risk: Wildlife Disturbance | |
| Motorized use of roads near fawning, calving, denning or nesting areas can cause harassment of wildlife, abandonment of young, and mortality of individuals | HIGH – Roads are located in 7 th field watersheds with open road/motorized trail density >3 mi/mi ² where the watersheds intersect mapped winter range, fawning or kidding habitat. OR Where the watersheds contain >50% mid- and late-mature forest, aspen and/or lodgepole below 5000'. |
| | MEDIUM - Roads are located in 7 th field watersheds with open road/motorized trail density between 1.5 and 3 mi/mi ² where the watersheds intersect mapped winter range, fawning or kidding habitat. OR Where the watersheds contain >50% mid- and late-mature forest, aspen and/or lodgepole below 5000'. |
| | LOW - Roads located in 7 th field watersheds other than above. |

| Recreation | |
|--|---|
| Benefit: Scenic Routes | |
| Roads provide access to areas of the Forest that are valued for their scenic attractiveness. Viewing natural features and driving for pleasure are among the most popular recreational activities on the Forest according to National Visitor Use Monitoring (2008). | HIGH - High benefit roads include high visual sensitivity routes (as referenced in the Forest Plan), provide access to areas of the Forest where scenery is of high value and reflects little evidence of human activity (areas managed under the Forest Plan as a Retention Visual Quality Objective) or regionally marketed recreation driving routes such as “Klamath Basin Birding Trails” or “Northern California Backcountry Roads”. |
| | MEDIUM - Medium benefit roads include moderate visual sensitivity routes (as referenced in the Forest Plan), or provide access to areas of the Forest where scenery is of moderate value and evidence of human activity is apparent but not overwhelming (areas managed under the Forest Plan as a Partial Retention Visual Quality Objective). |
| | LOW - any open road not listed above |
| Benefit: Access for Recreation | |
| Roads provide access to developed recreation sites (i.e., trails, campgrounds, picnic areas, recreation residences, and river accesses), and to the general forest area where uses (dispersed camping, etc.) can vary. | HIGH - A high benefit road provides the most direct access to developed recreation sites such as trailheads, campgrounds, picnic areas, river accesses, and recreation residences. |
| | MEDIUM - A medium benefit road that provides indirect or alternative access to the types of places listed above or direct access to undeveloped areas, or local recreation attractions and any level 3 routes designated for mixed use of highway-legal and non-highway legal vehicles. |
| | LOW - any open road not listed above |
| Risk: Quiet Non-Motorized Recreation | |
| Roads can provide a risk to quiet non-motorized recreation and wilderness character. | HIGH - High risk areas are designated wilderness areas, designated backcountry areas and areas within a .5 mile buffer of nationally designated trails: National Recreation Trails and the Pacific Crest National Scenic Trail. |
| | MEDIUM - A medium risk roads are those located within areas identified as semi-primitive non-motorized ROS class. |
| | LOW - any open road not listed above |

| Range | |
|--|--|
| Benefit: Permittee Access | |
| Roads provide access to range allotments where cattle are driven into the range allotment and picked up at the end of the grazing season | HIGH – These are primary access roads to grazing allotments that are presently used |
| | MEDIUM – These are secondary roads that could be used should the primary routes be closed |
| | LOW - These are routes that are unlikely to be used |

| Special Uses | |
|---|---|
| Benefit: Special Uses Permits | |
| Roads provide access for special use permit holders to maintain structures such as water lines, diversions intakes, etc | HIGH – Roads providing direct access to special uses of FS lands such as water diversions |
| | MEDIUM – Roads providing secondary access to special uses of FS lands such as water diversions |
| | LOW - Roads that do not meet the High or Medium criteria |

| Private Property Access | |
|---|--|
| Benefit: Private Property Access | |
| Road provide access to private land. | HIGH – Roads providing direct access to private property OR the closest road to landlocked private property |
| | MEDIUM – Roads providing secondary access for private land owners |
| | LOW - Roads that do not meet the High or Medium criteria |

| Minerals | |
|---|--|
| Benefit: Mineral rights Access | |
| Roads provide access to mining claims/prospects | HIGH – Roads providing the most direct and reasonable access to mining claims/prospects OR if no roads access the site, the road in closest proximity to the site |
| | MEDIUM – Roads providing secondary access to the site |
| | LOW - Roads that do not meet the High or Medium criteria |

Step 5: Describing Opportunities and Setting Priorities

Purpose

- Identify management opportunities and priorities that respond to issues, risks, benefits and other factors.

Recommendations

Below is a table of the recommended changes to the transportation system for the Elk Creek Watershed Project. A full summary by road can be seen in Appendix B

Table 3: Recommendations after risk and benefit analysis.

| Primary Recommendation | Miles | Percent of Total |
|---|------------|------------------|
| Leave as is | 95 | 67 percent |
| Upgrade to management level 3 | 10 | 7 percent |
| Downgrade to management level 1 | 13 | 9 percent |
| Downgrade portion to management level 1 | 2 | 1 percent |
| Decommission | 12 | 9 percent |
| Decommission portion | 10 | 7 percent |
| Total | 142 | |

Step 6: Reporting

Purpose

- List the key issues
- Prioritized list of risks and benefits associated with the roads within the Elk Creek Watershed Project area
- Opportunities to address risks and benefits
- Proposed additions and deletions to the forest transportation system

Key Issues

Current direction from the Washington office as well as from the Forest Plan is to decrease and update roads when attempting to improve watershed health. Elk Creek watershed is a key watershed as well as a municipal water supply. The Klamath National Forest Land and Resource Management Plan states that “Key Watersheds are highest priority for watershed restoration”. This makes the Elk Creek Watershed project a high priority for watershed restoration. Watershed restoration includes updating and reducing the roads within the transportation system to reduce anthropogenic sediment sources.

High road densities lead to increased risk of human caused fire, a reduction in habitat quality for both aquatic and terrestrial species, and an increased risk of spreading invasive species and disease. High densities of roads can also lead to a costly infrastructure from a management standpoint. Roads can also benefit the public and land managers. Roads allow wildland firefighters access to areas in emergency

situations. The public benefits from drivable roads when gathering firewood, gathering forest products, recreating, and hunting. Forest roads are necessary for some vegetation management and harvesting projects as well. From a cultural standpoint there are both benefits and risks to a change in the transportation system. Increased roads may allow for more easy access for tribe members to culturally relevant locations. An increase in access for tribal members will also increase access for the rest of the public. The easier access to tribally significant locations the more likely those areas will be damaged by vandalism or forest fire. All of these factors should be considered when the transportation system is reviewed.

Risks & Benefits

A comprehensive list of risks and benefits for each road within the project area boundary can be reviewed on the combined resource ranking spreadsheet.

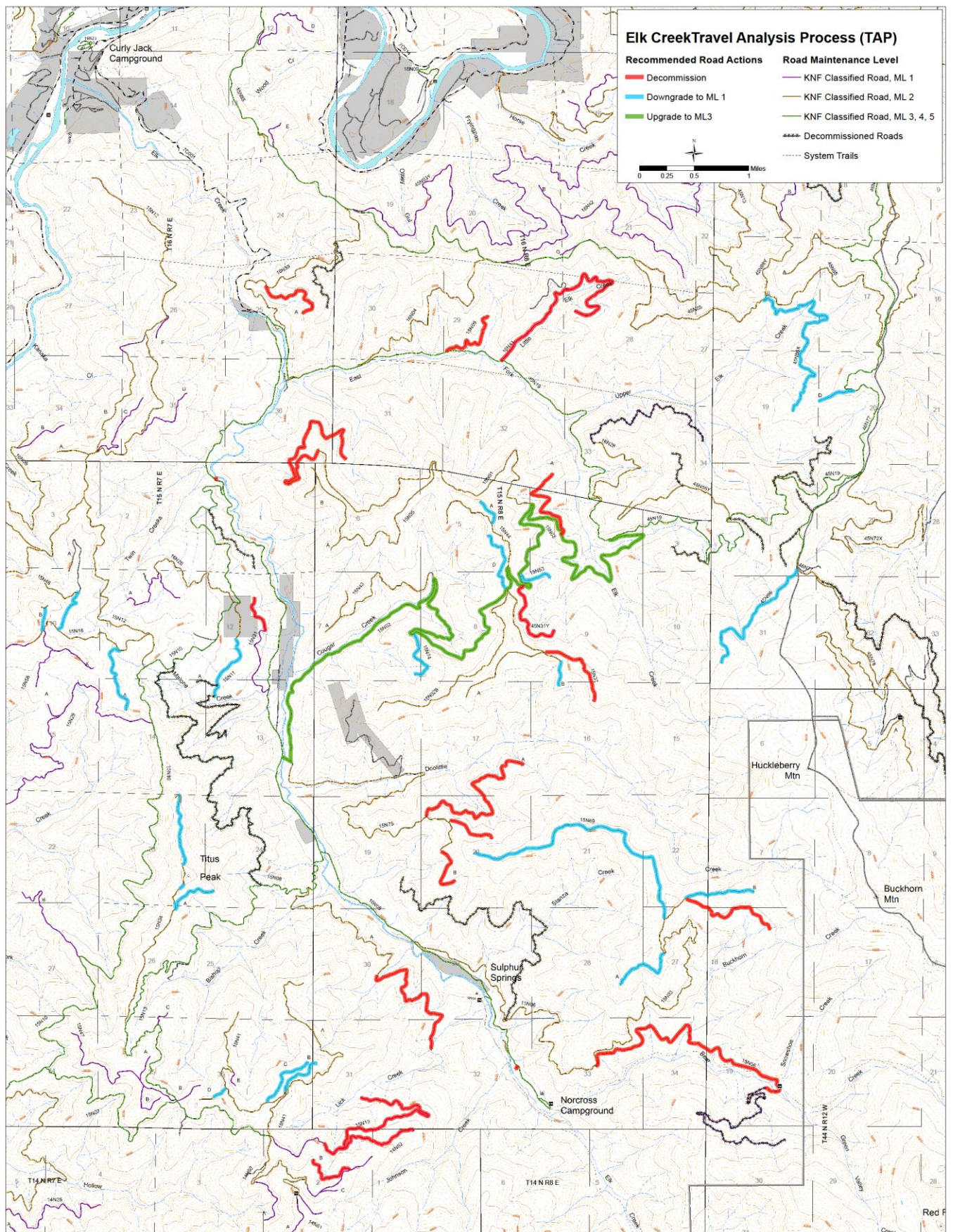
Opportunities

The opportunities to address risks and benefits are to decommission roads that are high risk and low benefit and upgrade roads that are high benefit. Table 3 shows the overall percentage of change within the project area. Overall the project will decrease the mileage of roads within the transportation system.

Proposed Action

Below is a map of the Project area and its proposed alterations to the transportation system.

Travel Analysis Process for the Elk Creek Watershed Project



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